

**Claims:**

- 1        1. Process for the manufacture of doped silica bodies comprising:
  - 2                (a) preparing a porous body of silica particles, the porous body  
3                        having a first porous region that is up-doped and a second porous  
4                        shell region comprising a lower doped or undoped portion,  
5                        (b) heating the porous body to a temperature of at least 1100 °C  
6                        in the absence of fluorine for a period sufficient to selectively  
7                        consolidate the first porous region,  
8                        (c) heating the porous body in a fluorine atmosphere to dope the  
9                        silica particles in the second porous region, and  
10                       (d) heating the porous silica body at a temperature greater than  
11                       1300 °C to consolidate the porous silica body.

- 2        2. Process for the manufacture of optical fibers comprising:

- 3                (a) preparing an optical fiber preform,  
4                (b) heating the preform to the softening temperature, and  
5                (c) drawing an optical fiber from the preform  
6        the invention characterized in that the optical fiber preform is produced by:
  - 7                        (i) preparing a porous body of silica particles, the porous body  
8                        having a first porous region that is up-doped and a second porous  
9                        shell region comprising a lower doped or undoped portion,

9 (ii) heating the porous body to a temperature of at least 1150 °C  
10 in the absence of fluorine for a period sufficient to selectively  
11 consolidate the first porous region,  
12 (iii) heating the porous body in a fluorine atmosphere to dope the  
13 silica particles in the second porous shell region, and  
14 (iv) heating the porous silica body at a temperature greater than  
15 1300 °C to consolidate the porous silica body.

1 3. Process for the manufacture of optical fibers comprising:

2 (a) preparing an optical fiber preform,  
3 (b) heating the preform to the softening temperature, and  
4 (c) drawing an optical fiber from the preform

5 the invention characterized in that the optical fiber preform is produced by:

6 (i) preparing a porous silica core rod of silica particles, the core  
7 rod having an inner up-doped region surrounded by an outer shell  
8 region, said outer shell region comprising a lower doped region,  
9 (ii) heating the porous silica core rod to a temperature of at least  
10 1100 °C in the absence of fluorine for a period sufficient to  
11 selectively consolidate the inner up-doped region,  
12 (iii) cooling the porous silica core rod  
13 (iv) introducing a fluorine-containing atmosphere with a first  
14 fluorine concentration to deposit fluorine on the silica particles in  
15 the lower doped region,

16 (v) reducing the fluorine concentration, and  
17 (vi) heating the porous silica body at a temperature greater than  
18 1300 °C, to consolidate the porous silica core rod.

1 4. The process of claim 3 wherein the fluorine atmosphere comprises  $\text{SiF}_4$ .

1 5. The process of claim 4 wherein the fluorine atmosphere is greater than 10%  
2  $\text{SiF}_4$ .

1 6. The process of claim 3 wherein the outer shell region is undoped silica.

1 7. The process of claim 3 wherein the inner core region is doped with  
2 germania.

1 8. The process of claim 7 wherein the inner core region is doped to a  $\Delta n$  in the  
2 range 0.001-0.058..

1 9. The process of claim 3 wherein the temperature used in step (iii) is in the  
2 range 500 - 1100 °C.